KARNATAK UNIVERSITY, DHARWAD

EFFECT OF AGE AND JAPA ON EXECUTIVE FUNCTIONS, EMOTIONAL STYLE AND TRIGUNA AMONG ADULTS.

SYNOPSIS

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Research Guide

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Introduction:

- **Executive Function:**

Cognitive psychology studies the mental processes that govern how individuals perceive, recall, communicate, think, take decisions, and solve problems. It encompasses various cognitive functions such as attention, perception, memory, language, and executive functions.

Executive function refers to a group of mental abilities such as working memory, flexible thinking, and self-control. We rely on these skills daily for learning, working, and managing everyday tasks. Difficulty with executive function can make it challenging to concentrate, follow instructions, and regulate emotions, among other things. Some psychologists describe in EF as "The management system of the brain." That's because the skills involved let us set goals, plan, and get things done. When people struggle with executive function, it impacts them at home, in school, work place and in life.

Executive functions are higher-level cognitive processes primarily governed by the prefrontal cortex. Key elements of executive functions include inhibition, working memory, and planning (Cerone, 2000). These abilities play a crucial role in regulating complex social behaviors. Executive functions aid in suppressing inappropriate actions and maintaining focus on relevant information (Burgess, Veitch, Costello & Shallice, 2000; Grafman & Litvan, 1999; Smith & Jonides, 1999). They enable mental flexibility, such as contemplating ideas, pausing before making decisions, handling unexpected challenges, resisting distractions, and sustaining attention. Core components of executive functions include inhibition (response inhibition—self-control, resisting impulses, and controlling interference), working memory, and cognitive flexibility (such as creative thinking, viewing situations from multiple perspectives, and adapting to changing conditions). (Diamond A,2013).

These executive functions are crucial not only for academic success but also for everyday life (Diamond A, et al., 2007). Additionally, they are essential for adapting and regulating behavior, as well as for mental and physical health, along with cognitive, social, and psychological development. (Diamond A 2013).

Executive functioning is considered to be a function of predominantly the brain's prefrontal cortex and anterior singulate gyrus. Although this is a generalization, other areas of the brain do take part, these areas are very active during executive functioning activities. When we are under stress these areas of the brain are less active, we are more under the control of autonomic systems and less able to think clearly. (Judy Hanning, 2017)

- **Emotional Style:**

The term emotion is derived from the Latin verb 'movere' means stir up, agitate, disturb or move. Woodworth has defined emotion as "conscious stirred up state of the organism. A conscious mental reaction (as anger or fear) subjectively experienced as strong feeling usually directed toward a specific object and typically accompanied by physiological and behavioural changes in the body (Kesebir P., et al., 2019).

Emotional Style refers to how we react to our emotional experiences in life. It affects the tendency to experience certain emotions, traits, and moods. In regards to emotional style, a distinction is made between emotional stimuli and sensory stimuli. "Emotional stimuli (as opposed to sensory stimuli) command an untoward share of our attention, and the ability to filter out emotional distractions is closely linked to psychological well-being" (Kesebir P., et al. 2019).

Emotional style refers to an individual's typical or characteristic way of experiencing, expressing, and managing their emotions. It encompasses how a person responds to different emotional situations, whether they tend to experience emotions intensely or subtly, and how they cope with and regulate their feelings. Kesebir *et al (*2019) proposed six dimensions of emotional style governed by specific brain circuit. These six dimensions are Outlook, Resilience, Social Intuition, Self-Awareness, Sensitivity to Context, and Attention.

Outlook dimension of emotional style is the ability to sustain positive emotions over time.

Resilience means ability to recover from negative emotions like fear, loss, sadness etc.

Social intuition is ability to read nonverbal cues facial expressions, body language or vocal intonations and be able to understand others' emotional states.

Self-awareness is ability to perceive their bodily signals that reflect emotions and attend to emotional cues that arise within them and recognize and interpret them.

Sensitivity to context refers to the degree with which our emotional and behavioral responses take into account our social context, such as showing appropriate response in interpersonal relations, dressing in socially appropriate way etc.

Attention is ability to screen out distraction and stay focused.

- ## Triguna:

Triguna in Classical Indian literature represents the fundamental essence underlying the existence of all things in the universe. It encompasses both a material and a mental aspect. The material aspect pertains to the physical world, while the mental aspect relates to the psychological and spiritual realms.

Triguna is an ancient concept of personality rooted in the mind-body complex, originating from the Rig Veda and Atharva Veda and further explored in the Sankhya Darshan and Bhagavad Gita. It consists of three fundamental qualities or "gunas": Sattva (purity, knowledge), Rajas (activity, passion), and Tamas (inertia, ignorance). The predominance of these gunas in an individual influences their physical, psychological, and behavioral traits, shaping their personality. Though the gunas are latent and cannot be directly perceived, they manifest in different actions and characteristics. This concept is discussed across various sacred texts, including the Upanishads, Ayurveda, Mahabharata, and other scriptures. (Murphy T.F, 2021).

- ## Japa or Mantra:

Mantra Yoga is a scientific method devised by the *Rishis* to activate the extrasensory energy centers within to facilitate the sublime flow of vital spiritual currents in this majestic living system. (Kumar, K. 2015).

Japa is the repetition of any Mantra of Name of the Lord. In this Kali Yuga or iron age when the physique of the vast majority of persons is not good, rigid Hatha Yogic practices are very difficult. Japa is an easy way to God-realisation. Japa is an important Anga of Yoga.

In the Bhagvad Gita we find "Yajnanam Japa- Yajnosmi- Among Yajnas, I am Japa-Yajna." (10.25). In Kali Yuga the practice of Japa alone can give eternal Peace, Bliss and Immortality. Japa ultimately results in Samadhi or communion with the Lord. Japa must become habitual and must be attended with Sattvic or Divine Bhava, purity, Prema and Sraddha. There is no Yoga greater than Japa Yoga. It can give you all IshtaSiddhis (whatever you want), Bhakti and Mukti. (Sivananda S. 2010).

• REVIEW OF LITERATURE

In this chapter research studies conducted on effect of age and other factors on executive functions, Emotional style/ intelligence and personality factors are reviewed. Scientific studies on the effect of Japa, Mantra or Yoga on executive functions are also reviewed to gain insight in to the process of executive functions and its role in emotional reactions and personality. The studies are reported in three major categories viz.

- Validation studies of EF
- Age effect on Executive Functions
- Age effect on Emotions
- Effect of Japa on Executive Functions
- Effect of Japa on Emotions
- Effect of Japa on Triguna Personality
- Studies on Correlation between Executive Function and Emotion

• Need for the Present Study:

Executive functions play a key role in ones everyday life which mediates many higher order cognitive processes which is evident from the studies reviewed. Adulthood is a very crucial phase where most of the major decisions of life are taken and executed. The relationships and occupational/ professional roles become major part of the adult life. The present study throws light upon the adults' cognitive and emotional preparedness for the same. Age related developmental

studies on executive function in Indian context are rare. Thus it's very essential to study the level of EF, Emotional style and personality traits or Gunas in Indian population. What are some the ways to balance or enhance them? is a major concern to help adults. Japa chanting is said to balance the mind especially cognition –emotion link. The review shows clear gap in the scientific studies on effect of japa on cognitive functions. Hence the present study is undertaken to see the effect of japa on executive functions, emotional style and personality trait- Triguna.

RESEARCH METHOD

- **Objectives:**

1. To study the level of Executive functions, Emotional style among Adults of different age groups

2. To study the effect of Japa on Executive functions, Emotional style and Personality type- Triguna- among Adults.

- **Research Problems**:

1. Is there any difference in the level of Executive functions among different age groups of Adults?

2. Do Emotional style vary with age among Adults?
3. Do male and female significantly differ in their Emotional styles?
4. Do japa chanters significantly differ in their Executive Function from non-chanters?
5. Do japa chanters significantly differ in their Emotional Style from non-chanters?
6. Do japa chanters significantly differ in their Personality type (Triguna) from non-chanters?

- **Hypothesis:**

Ha1: There will be significant difference in the level of Executive Functions among the adults of different age groups.

Ha1.1: There will be significant difference in the level of Working memory among the adults of different age groups.

Ha1.2: There will be significant difference in the level of Response inhibition among the adults of different age groups.

Ha1.3: There will be significant difference in the level of Cognitive flexibility among the adults of different age groups.

Ha2: There will be significant difference in the level of Emotional Style among the adults of different age groups.

Ha2.1: There will be significant difference in the level of Outlook among the adults of different age groups.

Ha2.2: There will be significant difference in the level of Resilience among the adults of different age groups.

Ha2.3: There will be significant difference in the level of Social intuition among the adults of different age groups.

Ha2.4: There will be significant difference in the level of Self-awareness among the adults of different age groups.

Ha2.5: There will be significant difference in the level of Sensitivity to context among the adults of different age groups.

Ha2.6: There will be significant difference in the level of Attention among the adults of different age groups.

Ha2.7: There will be significant gender difference in the level of Emotional styles among adults.

Ha3: Japa chanters significantly differ in their level of Executive Functions from non-chanters.

Ha3.1: Japa chanters significantly differ in their level of Working memory from non-chanters.

Ha3.2: Japa chanters significantly differ in their level of Response inhibition from non-chanters.

Ha3.3: Japa chanters significantly differ in their level of Cognitive flexibility from non-chanters.

Ha4: Japa chanters significantly differ in their level of Emotional style from non-chanters.

Ha4.1: Japa chanters significantly differ in their level of Outlook from non-chanters.

Ha4.2: Japa chanters significantly differ in their level of Resilience from non-chanters.

Ha4.3: Japa chanters significantly differ in their level of Social intuition from non-chanters.

Ha4.4: Japa chanters significantly differ in their level of Self-awareness from non-chanters.

Ha4.5: Japa chanters significantly differ in their level of Sensitivity to context from non-chanters.

Ha4.6: Japa chanters significantly differ in their level of Attention from non-chanters.

Ha5: Japa chanters significantly differ in their level of Triguna from non-chanters.

Ha5.1: Japa chanters significantly differ in their level of Satvika from non-chanters.

Ha5.2: Japa chanters significantly differ in their level of Rajasika from non-chanters.

Ha5.3: Japa chanters significantly differ in their level of Tamasika from non-chanters.

- ## Variables:

Independent Variable: 1. Age groups of adults- 21-25, 26- 30, 31- 35, 36-40.

2. Japa Chanting

Dependent Variables: 1. Executive functions. 2. Emotional style. 3. Triguna

- ## Operational definitions:

Japa Chanting: Japa is the repetition of any Mantra of Name of the Lord. (Shivananda S, 2010).

Hare Krishna Mahamantra Japa chanted regularly sixteen rounds daily for more than one year.

Executive Function: Executive function is a set of mental skills. It includes working memory, flexible thinking, and self-control. We use these skills every day to learn, work, and manage daily life. Trouble with executive function can make it hard to focus, follow directions, and handle emotions, among other things. (Gail Belsky)

Executive Functions (EFs): Core executive functions (EFs) involve mentally exploring ideas, taking time to think before making decisions, tackling unexpected challenges, resisting temptations, and maintaining focus. These EFs include inhibition, which encompasses self-control (resisting impulses and temptations) and interference control (selective attention and cognitive inhibition), working memory, and cognitive flexibility. (Diamond A. 2013)

Inhibitory Control: Inhibitory control refers to the ability to manage one's attention, behavior, thoughts, and/or emotions to resist a strong internal urge or external temptation, and instead act in a way that is more suitable or necessary. When expressed as **Response Inhibition**, it involves suppressing dominant mental representations (cognitive inhibition).

Cognitive Flexibility: Cognitive flexibility refers to the ability to shift perspectives, either spatially (for example, asking, "How would this appear if I looked at it from another angle?") or interpersonally (such as, "Can I understand this from your viewpoint?") (Milner 1964, Stuss *et al.* 2000). It includes thinking creatively, viewing situations from multiple perspectives, and quickly adapting to changing conditions. (Diamond A. 2013)

Working Memory: It involves retaining information in mind and mentally working with it when information is no longer actively perceived. (Baddeley & Hitch 1994, Smith & Jonides 1999).

Emotional Style: Emotional style refers to an individual's typical or characteristic way of experiencing, expressing, and managing their emotions. It encompasses how a person responds to different emotional situations, whether they tend to experience emotions intensely or subtly, and how they cope with and regulate their feelings. Kesebir *et al (*2019) proposed six dimensions of emotional style governed by specific brain circuit. These six dimensions are Outlook, Resilience, Social Intuition, Self-Awareness, Sensitivity to Context, and Attention.

Outlook dimension of emotional style is the ability to sustain positive emotions over time.

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Social intuition is ability to read nonverbal cues facial expressions, body language or vocal intonations and be able to understand others' emotional states.

Self-awareness is ability to perceive their bodily signals that reflect emotions and attend to emotional cues that arise within them and recognize and interpret them.

Sensitivity to context refers to the degree with which our emotional and behavioral responses take into account our social context, such as showing appropriate response in interpersonal relations, dressing in socially appropriate way etc.

Attention is ability to screen out distraction and stay focused.

Triguna: Ayurveda classifies persons according to *Prakruti* of two types i.e. Sharir Prakruti and Manas Prakruti. Under Manas prakruti Triguna- Satvika, Rajasika and Tamasika features -are described. Rajas and Tamas are considered as the two doshas of the manas (mind).
Satvika: Means balanced and quality of illuminating, pure or good quality which leads to clarity and mental serenity sattva is full of love. Sattva is light, light giving full of knowledge.

Rajasika: Means passionate and quality of mobility or activity which makes a person active, energetic, tense and willful.

Tamasika: Means dull and quality is inertia and restfulness.

- ## Research Design:

1. A cross-sectional design is adopted to see the difference in performance of EF and Emotional style in the age groups of 21 to 40 years.
2. Matched group design is adapted to compare the performance of Japa chanters and Non –chanters in EF, Emotional style and Triguna in the second phase of the study.

- ## Tools Used:

A bio data sheet is prepared to collect personal and demographic information of the participants.

General Health Questionnaire (GHQ) is used to screen the participants of health conditions.

Executive functions are assessed using digit span test from PGI Memory Scale for Working memory, Stroop test and WCST–adapted version by Stoet in Psytoolkit for assessing response inhibition and cognitive flexibility respectively.

Emotional style is assesses through Emotional Style Questionnaire (ESQ)- developed by Kesebir P.*et al* (2019).

Vedic Personality Inventory (VPI) developed by Wolf D.B. (1998) to assesses three types of personality i.e. Satwik, Rajasik and Tamasik- the classification based on Veda.

- **Sample:**

A cross sectional sample of Adults in the age group of 21-25, 26-30, 31-35, 36-40. Each age group include male and female participants.

Japa Chanters: ISKCON devotees in the age range of 21 to 59 who chant daily 16 rounds of Hare Krishna Mahamantra.

Non chanters: participants who do not chant any japa but equal in their level of education, age and gender are included in the study.

- **Data Collection:**

Researcher met participants individually in their place and administered tools after establishing a good rapport and taking informed consent for their participation in the study. Each individual required approximately one hour to complete the whole assessment process. Totally 370 participants were assessed out of which 67 participants eliminated in screening test and 303 participants aged between 21 to 59 years were retained for analysis.

- **Analysis of the Results:**

The data collected is entered in SPSS after scrutiny for further analysis.

1. Normality of distribution is tested by Sapiro- Wilk test.
2. Ha1 is tested using ANOVA or non parametric equivalent Kruskal Wallis H test
3. Ha2 is verified using t –test for paired sample or non parametric equivalent Mann-Whitney U test

- **Ethical Considerations Followed:**

1. Informed consent is sought.
2. Confidentiality was assured and maintained.
3. No physical or emotional harm was induced.
4. Debriefing will be done at the end of the study.

SUMMARY AND CONCLUSIONS

- **Summary:**

Executive functions are considered as “the management system of the brain” because the skills involved let us set goals, plan, and get things done. Executive function is a set of mental skills that include working memory, flexible thinking, and self-control. We use these skills every day to learn, work, and manage daily life. When people struggle with executive function, it impacts them at home, in school, and in life.

Emotional style is our consistent and patterned way of responding to our passing emotional states. Richard Davidson theorizes that we have individual emotional styles that form our relationship with experiences. Emotional style refers to an individual's typical or characteristic way of experiencing, expressing, and managing their emotions. It encompasses how a person responds to different emotional situations, whether they tend to experience emotions intensely or subtly, and how they cope with and regulate their feelings. Kesebir *et al (*2019) proposed six dimensions of emotional style governed by specific brain circuit. These six dimensions are Outlook, Resilience, Social Intuition, Self-Awareness, Sensitivity to Context, and Attention.

Adulthood is a very crucial phase where most of the major decisions of life are taken and executed. Developing intimate relationships and settling occupational/ professional roles become major part of the adult life. The present study throws light upon the adults’ cognitive and emotional preparedness for the same. Studies on development of executive function in Indian context are rare. Thus, it is decided to study the level of EF, Emotional style among young adults in India. A dearth of studies is noted that focus on enhancing EF, balancing emotions and the technique to find the link between emotion regulation and cognitive functions. Japa chanting is said to balance the mind especially cognition –emotion link. The review shows clear gap in the scientific studies on effect of japa on cognitive functions. Hence the present study is undertaken to see the effect of japa on executive functions, emotional style and personality trait- Triguna.

- **Major Findings:**

  - **Executive Function in Four Age Groups of Adults:**

1. Working memory gradual declines in different age groups of adults specifically in a span of 10 years.
2. Response inhibition accuracy is gradually decreasing with advancing age but there is no much difference in speed.
3. Cognitive flexibility declines as age advances after 31 years among adults.
4. Executive functions begin to decline after 30 years of age.
5. Reaction time in WSCT significantly increased with age however processing speed among adults is not showing gradual decline or a specific pattern.

  - **Emotional styles- Outlook, Resilience, Self-Awareness, Sensitivity to Context Varies as Age Advances:**

6. Outlook is found to decline gradually as age advances.
7. Resilience is increasing in early years of adulthood i.e 21 to 30 and declining after the age of 31years.
8. Slight but insignificant increase in social intuition in the age group 21to 40 is seen.
9. Highest level of self awareness is seen in the age 26 to 36.
10. Young adults in the age 21 to 36 are highly sensitive to social context.
11. No significant difference is found in Social Intuition and Attention dimensions of Emotional styles among different age groups of adults.
12. Women have significantly higher level of self awareness and sensitivity to context compared to men
13. No significant gender difference is found in Outlook, Resilience, Social Intuition and Attention dimensions of emotional style.

  - **Executive Function in Chanters and Non Chanters:**

1. working memory capacity is significantly better in chanters group compared to Non chanters.
2. Japa chanters have significantly better response inhibition than non chanters.
3. Japa chanters have significantly better cognitive flexibility than non chanters.
4. Japa chanters are significantly better in Executive Function than non chanters.

  - **Emotional Style among Japa Chanters and Non Chanters:**

5. Chanters have significantly more positive outlook about life than non chanters.
6. Chanters are significantly more resilient than Non chanters.
7. Social Intuition which is significantly better in chanters compared to the Non chanters.

8. Chanters have significantly better Self awareness than non chanters.
9. Chanters have significantly better Attention than non chanters.
10. There is no significant difference in Sensitivity to Context between chanters and non chanters.
11. Japa chanters have significantly better emotional style compared to non chanters.

- **Triguna among Japa Chanters and Non Chanters:**

12. Japa chanters are significantly more *Satvik* than non chanters.
13. Non chanters are significantly more *Rajasik* than Chanters
14. Non chanters are significantly more *Tamasik* than chanters.

- **Conclusions:**

1. Executive functions are at optimum level in early adulthood and begin to decline after 30 years of age.
2. **Emotional styles**- Outlook, Resilience, Self-Awareness, Sensitivity to Context varies as age advances.
3. Young adults in the age group 21 -26 have more positive outlook, more resilient and highly sensitive to context. Age group 26 to 30 have higher level of Self awareness.
4. Women have significantly higher level of self-awareness and sensitivity to context compared to men. There is no significant gender difference in Outlook, Resilience, Social Intuition and Attention dimensions of emotional style.
5. Executive functions- Working memory, Response inhibition and cognitive flexibility are significantly better in Japa chanters compared to non chanters.
6. Emotional style - Outlook, Resilience, Self-Awareness, social intuition and attention are better in Japa chanters compared to non chanters. Where as in Sensitivity to Context both the groups are at the same level.
7. Japa chanters are More Satvik than non chanters whereas Non chanters are more Rajasik and Tamasik than chanters.

- **Implication of the Study**:

1. Executive functions in adulthood is very crucial cognitive functions as major decisions about career, stable relationship and establishing a family are the major purpose in adulthood. Knowledge

of the level of EF and emotional style in this period smooth the progress in achieving key life goals of young adults. The findings of the present study is i.e EF are at optimum level in 21 to 30 years and the onset of decline is seen at 31 years of age.

2. It is scientifically proved that Japa chanting enhances EF emotional regulations and *Satvik* nature in personality. Adapting Japa in daily life of individuals will not only improve wellbeing but also help in preventing mental illness and interpersonal conflict in the community.
3. Japa is extremely helpful in advancing higher levels of consciousness like *Dhyana* and *Samadhi* for the spiritual seekers as it refines cognitive and emotional spheres of personality.

• Limitation of the Study:

1. Random sampling is not used which limits the generalizability of the study findings.
2. The cross sectional design is adapted which need to be carefully considered while inferring the age effect. Longitudinal study would be more appropriate.
3. The effect of age in EF could not be controlled statistically due to skewed nature of distribution.
4. Matched group is used instead of control group because it was practically beyond the feasible limit

Research Scholar — Research Guide

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